

**IN THE CLAIMS**

Please amend the claim as follows:

1. (Currently Amended) An Ethernet-PON (Passive Optical Network) for integrating broadcast and communication based on a TDM (Time Division Multiplexing) scheme, comprising:

an OLT (Optical Line Terminal) ~~for configured performing~~ (i) to perform a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to respective broadcast/image selection information transmitted from users, (ii) to perform a time division multiplexing on the digital broadcast/image data to convert ~~it the~~ digital broadcast/image data into a broadcast/image signal, (iii) to perform a frame-multiplexing on the broadcast/image signal and communication data received through an IP (Internet Protocol) network into a single frame, ~~and~~ (iv) to electro-optically converting the single frame, and (v) to transmitting the frame electro-optically converted signal;

a plurality of ONTs (Optical Network Terminals), each ONT adapted ~~for to receiving~~ an optical signal from the OLT, the ONT configured and for to photoelectrically converting the received optical signal, to performing a frame & time-slot demultiplexing on the photoelectrially converted signal, to output entire received the communication signals data and the selected broadcast/image information data included in a time slot assigned to the ONT the photoelectrially converted signal to a corresponding user, and to receiving a communication signal and the broadcast/image selection information from one of the users to output them to the OLT; and

an optical splitter arranged in a path between the OLT and the plurality of ONTs, said optical splitter splitting a signal from the OLT into the plurality of ONTs, coupling signals from

the plurality of ONTs, and transmitting the coupled signal to the OLT.

2. (Currently Amended) The Ethernet-PON according to claim 1, wherein the OLT includes:

a broadcast/image channel selection switch ~~for configured to receiving~~ and switching external MPEG (Motion Picture Experts Group) broadcast and image data,

a broadcast/image time-slot multiplexer ~~for configured to assigning~~ broadcast/image channels, output from the broadcast/image channel selection switch, to a time-slots assigned respectively to ~~the each~~ users so as to multiplex the channels;

an Ethernet-PON OLT function processor ~~for configured to performing~~ Ethernet-PON OLT functions;

an IP router ~~for configured to routing~~ a communication signal to an upper level IP network or to the Ethernet-PON OLT function processor;

an Ethernet time-slot matching buffer ~~for configured to storing~~ the communication data from the Ethernet-PON OLT function processor that is transmitted to the OLT ~~for matching/coupling to the time slot multiplexed broadcast/image signal output from the time slot multiplexer and to prepare the communication data to be frame multiplexed;~~

a frame multiplexer ~~for configured to multiplexing~~ the time-slot-multiplexed broadcast/image signal from the broadcast/image time-slot multiplexer and the communication signal stored in the Ethernet time-slot matching buffer into a single frame;

a first optical transmitter ~~for configured to optically modulating~~ a frame-multiplexed signal outputted from the frame multiplexer, and transmitting the modulated signal as an optical signal of  $\lambda_{DOWN}$ ; and

a first optical receiver ~~for configured to receiving~~ an optical signal from the ONTs and

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converting the optical signal into an electrical signal.

3. (Currently Amended) The Ethernet-PON according to claim 1, wherein each of the plurality of ONTs includes:

a second optical receiver ~~for—configured to receive~~ receiving the signal transmitted as the optical signal of  $\lambda_{DOWN}$  from the OLT, and photoelectrically converting the optical signal;

a second optical transmitter ~~for—configured to~~ electro-optically converting upstream data and transmitting the upstream data to the OLT;

a frame/time-slot demultiplexer ~~for—configured to~~ separating the frame/time-slot-multiplexed broadcast/image and communication signals;

an Ethernet-PON ONT function processor ~~for—configured to~~ receiving the communication signal from the frame/time-slot demultiplexer, and ~~to~~ performing ONT functions on the function processor; and

a broadcast/image adapter ~~for—configured to~~ recovering a time-slot-format broadcast/image signal, separated by the frame/time-slot demultiplexer, into an original signal.

4. (Currently Amended) The Ethernet-PON according to claim 2, wherein each of the plurality of ONTs includes:

a second optical receiver ~~for—configured to receive~~ receiving the signal transmitted as the optical signal of  $\lambda_{DOWN}$  from the OLT, and photoelectrically converting the optical signal;

a second optical transmitter ~~for—configured to~~ electro-optically converting upstream data and transmitting the upstream data to the OLT;

a frame/time-slot demultiplexer ~~for—configured to~~ separating the frame/time-slot-multiplexed broadcast/image and communication signals;

an Ethernet-PON ONT function processor for ~~configured to receiving~~ the communication signal from the frame/time-slot demultiplexer, and ~~to performing~~ ONT functions ~~on the function processor;~~ and

a broadcast/image adapter for ~~configured to recovering~~ a time-slot-format broadcast/image signal, separated by the frame/time-slot demultiplexer, into an original signal.

5. (Currently Amended) The Ethernet-PON according to claim 1, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a predetermined number of time-slots, and each of the time-slots includes a broadcast/image sub-time-slot ~~for containing~~ a broadcast/image signal and an Ethernet sub-time-slot ~~for containing~~ a communication signal.

6. (Currently Amended) The Ethernet-PON according to claim 2, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a predetermined number of time-slots, and each of the time-slots includes a broadcast/image sub-time-slot ~~for containing~~ a broadcast/image signal and an Ethernet sub-time-slot ~~for containing~~ a communication signal.

7. (Currently Amended) The Ethernet-PON according to claim 6, wherein the broadcast/image sub-time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, and said time-slot ~~being is-left empty or filled with null data if there is no broadcast/image signal selected by the ONT.~~

8. (Currently Amended) The Ethernet-PON according to claim 6, wherein the Ethernet sub-time-slot ~~may contains~~ communication data of every ONT.

9. (Currently Amended) The Ethernet-PON according to claim 1, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a sub-frame for broadcast/image signals and a sub-frame for Ethernet communication signals, and—the sub-frame for broadcast/image signals includesing broadcast/image time-slots, ~~respectively, for that~~ containing broadcast/image signals of the ONTs.

10. (Currently Amended) The Ethernet-PON according to claim 2, wherein the single frame obtained by multiplexing the broadcast/image signal and the communication signal is divided into a sub-frame for broadcast/image signals and a sub-frame for Ethernet communication signals, and—the sub-frame for broadcast/image signals includesing broadcast/image time-slots, ~~respectively, for that~~ containing broadcast/image signals of the ONTs.

11. (Currently Amended) The Ethernet-PON according to claim 9, wherein the broadcast/image time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, ~~and said time-slot is being left empty or filled with null data if there is no broadcast/image signal selected by the ONT.~~

12. (Currently Amended) The Ethernet-PON according to claim 9, wherein the sub-frame for Ethernet communication signals ~~may contains~~ communication data of every ONT.

13. (Currently Amended) An Ethernet-PON for integrating broadcast and communication based on a TDM scheme, comprising:

an OLT ~~for configured~~ (i) to performing (i) a switching operation on a plurality of digital broadcast/image data received from an external broadcast provider according to ~~respective~~ broadcast/image selection information transmitted from users[[],]; (ii) to performing a time division multiplexing on the digital broadcast/image data to convert ~~it~~ the digital broadcast/image data into a broadcast/image signal[[],]; (iii) to electro-optically converting the broadcast/image signal into a broadcast/image optical signal of  $\lambda_B$ [[],]; (iv) to electro-optically converting communication data received ~~through~~ from an IP network into a communication optical signal of  $\lambda_{DOWN}$ [[],]; (iv)-(v) coupling the broadcast/image optical signal of  $\lambda_B$  and the communication optical signal of  $\lambda_{DOWN}$  into a single optical signal[[],]; and (vi) to transmitting the single optical signal;

a plurality of ONTs, each ONT configured to receiving an optical signal from the OLT[[],]; to separating the received optical signal into the broadcast/image optical signal of  $\lambda_B$  and the communication optical signal of  $\lambda_{DOWN}$ [[],]; to photoelectrically converting the two separated signals[[],]; to performing time division demultiplexing on the photoelectrically converted broadcast/image signal to convert ~~it~~ the photoelectrically converted broadcast/image signal into the broadcast/image information data[[],]; to outputting the broadcast/image information data and the photoelectrically converted communication signal to a corresponding user[[],]; and to receiving a communication signal and the broadcast/image selection information from the user to output them to the OLT; and

an optical splitter ~~for configured~~ to splitting a signal from the OLT into the plurality of ONTs, coupling signals from the plurality of ONTs, and transmitting the coupled signal to the

OLT.

14. (Currently Amended) The Ethernet-PON according to claim 13, wherein the OLT includes:

- a broadcast/image channel selection switch ~~for configured to receiving, to switching and to outputting~~ an external MPEG broadcast and image data;
- a time division multiplexer ~~for configured to assigning~~ broadcast/image channels output from the broadcast/image channel selection switch to time-slots assigned respectively to the users, so as to multiplex the channels in a TDM scheme;
- a first optical transmitter ~~for configured to optically modulating~~ the time-division-multiplexed broadcast/image signal;
- an Ethernet-PON OLT function processor ~~for configured to performing~~ Ethernet-PON OLT functions;
- an IP router ~~for configured to routing~~ communication data to an upper level IP network or to the Ethernet-PON OLT function processor;
- a second optical transmitter ~~for configured to optically modulating~~ communication data to be transmitted to the plurality of ONTs;
- a first optical receiver ~~for configured to receiving~~ an optical signal from the plurality of ONTs, converting the optical signal into an electrical signal, and transferring the converted signal to the Ethernet-PON OLT function processor;
- a broadcast/image channel selection controller ~~for configured to receiving~~ the broadcast/image selection information from the plurality of ONTs through the Ethernet-PON OLT function processor, and transferring a control signal to the broadcast/image channel selection switch to allow the broadcast/image channel selection switch to select broadcast/image

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channels corresponding respectively to the plurality of ONTs; and

a first WDM coupler ~~for configured to couple~~ing the optically modulated communication signal of  $\lambda_{DOWN}$  and the optically modulated broadcast/image signal of  $\lambda_B$ , and to output the coupled signal.

15. (Currently Amended) The Ethernet-PON according to claim 13, wherein each of the plurality of ONTs includes:

a second WDM coupler ~~for configured to separate~~ing an optical signal received from the OLT into a communication signal of  $\lambda_{DOWN}$  and a broadcast/image signal of  $\lambda_B$ ;

a second optical receiver ~~for configured to receive~~ing the separated communication signal of  $\lambda_{DOWN}$ , and converting the communication signal into an electrical signal;

a third optical receiver ~~for configured to receive~~ing the separated broadcast/image signal of  $\lambda_B$ , and converting the separated broadcast/image signal into an electrical signal;

an Ethernet-PON ONT function processor, connected to the second optical receiver, ~~for configured to perform~~ing ONT functions;

a third optical transmitter ~~for configured to receive~~ing broadcast/image selection information and a communication signal to be transmitted to the OLT from a corresponding user through the Ethernet-PON ONT function processor, and transmitting them as an optical signal  $\lambda_{UP}$ ; and

a time division demultiplexer & broadcast/image adapter ~~for configured to receive~~ing the broadcast/image signal converted into the electrical signal, performing time division demultiplexing on the received signal, and recovering a time-slot-format broadcast/image signal, obtained through the time division demultiplexing, into an original signal.

16. (Currently Amended) The Ethernet-PON according to claim 13, wherein the time-division-multiplexed broadcast/image signal includes time-slots for broadcast/image signals corresponding respectively to the plurality of ONTs, ~~and~~ each of the time-slots includesing a predetermined number of sub-time-slots for accommodating the same predetermined number of broadcast/image signals.

17. (Currently Amended) The Ethernet-PON according to claim 14, wherein the time-division-multiplexed broadcast/image signal includes time-slots for broadcast/image signals corresponding respectively to the plurality of ONTs, ~~and~~ each of the time-slots includinges a predetermined number of sub-time-slots for accommodating the same predetermined number of broadcast/image signals.

18. (New) The Ethernet-PON according to claim 6, wherein the broadcast/image time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, said time-slot being filled with null data if there is no broadcast/image signal selected by the ONT.

19. (New) The Ethernet-PON according to claim 9, wherein the broadcast/image sub-time-slot contains a broadcast/image signal selected by one of the ONTs corresponding to said time-slot's order, and said time-slot being filled with null data if there is no broadcast/image signal selected by the ONT.

20. (New) The Ethernet-PON according to claim 1, wherein the switching operation, which the OLT is configured to perform, comprises selecting a broadcast/image data channels from a plurality of broadcast/image channels, which received from an external broadcast provider, according to the broadcast/image selection information transmitted from each user.

21. (New) The Ethernet-PON according to claim 13, wherein the switching operation, which the OLT is configured to perform, comprises selecting a broadcast/image data channels from a plurality of broadcast/image channels, which received from an external broadcast provider, according to the broadcast/image selection information transmitted from each user.